

541,970

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 July 2004 (29.07.2004)

PCT

(10) International Publication Number
WO 2004/063430 A1

(51) International Patent Classification⁷: **C30B 25/10**,
25/02, 29/04, C23C 16/27, 16/511

(21) International Application Number:
PCT/EP2003/007142

(22) International Filing Date: 18 June 2003 (18.06.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03 00254 10 January 2003 (10.01.2003) FR

(71) Applicants (for all designated States except US):
CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE-CNRS [FR/FR]; 3 Rue Michel Ange, F-75016 Paris Cédex 16 (FR). **UNIVERSITE PARIS NORD (PARIS XIII) INSTITUT GALILEE** [FR/FR]; 99, Av. Jean-Baptiste Clément, F-93430 Villetaneuse (FR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GICQUEL, Alix, Hélène** [FR/FR]; 96, rue d'Hauteville, F-75010 Paris

(FR). **SILVA, François** [FR/FR]; 50 Rue des Thermes, F-95880 Enghien (FR). **DUTEN, Xavier** [FR/FR]; 279, rue de Vaugirard, F-75015 Paris (FR). **HASSOUNI, Khaled** [MA/FR]; 5, Rue Edmond Michelet, F-94270 Le Kremlin-Bicêtre (FR). **LOMBARDI, Guillaume, Vincent** [FR/FR]; 9, Rue de la Justice, F-78710 Rosny Sur Seine (FR). **ROUSSEAU, Antoine** [FR/FR]; 7, rue des Petits Carreaux, F-75002 Paris (FR).

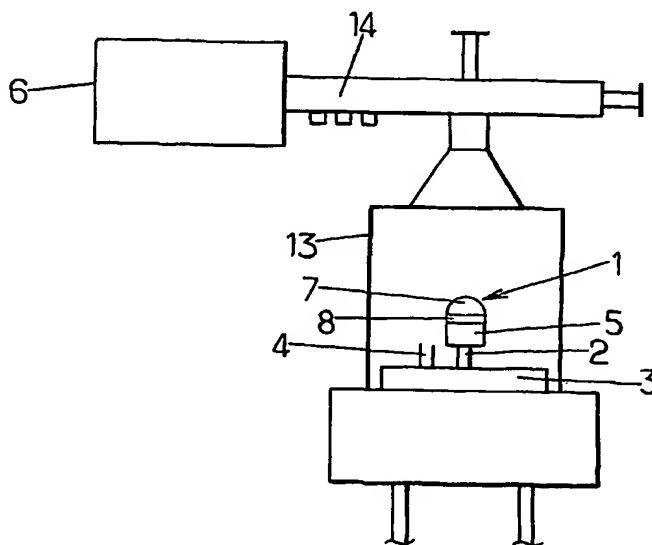
(74) Agents: **BURBAUD, Eric et al.**; Cabinet Plasseraud, 65/67 Rue de la Victoire, F-75440 Paris Cedex 09 (FR).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,

[Continued on next page]

(54) Title: HIGH-SPEED DIAMOND GROWTH USING A MICROWAVE PLASMA IN PULSED MODE



(57) Abstract: Method for manufacturing a diamond film of electronic quality at a high rate using a pulsed microwave plasma, in which, in a vacuum chamber, a plasma of finite volume is formed near a substrate by subjecting a gas containing at least hydrogen and carbon to a pulsed discharge, which has a succession of low-power states and of high-power states, and having a peak absorbed power P_e , so as to obtain at least carbon-containing radicals in the plasma and to deposit the said carbon-containing radicals on the substrate in order to form a diamond film thereon. Power is injected into the volume of the plasma with a peak power density of at least 100 W/cm³, while maintaining the substrate to a substrate temperature of between 700°C and 1000°C.

WO 2004/063430 A1



ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.